



Rec'd PCT/PTO 22 MAR 2002 #6

SEQUENCE LISTING

<110> Cahoon, Rebecca E.  
Lee, Jian-Ming  
Tao, Youn

<120> PLANT 1-DEOXY-D-XYLULOSE 5-PHOSPHATE REDUCTOISOMERASE

<130> BB-1297

<140> US/09/857,557

<141> 2001-09-22

<150> 60/110,865

<151> 1998-12-04

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tggctgcact caaggcatcg ttccgggggtg agctcagcgc cgcttccttc ctcgactcca 240
gcaggggacc tctcgtccag cacaaagtgg attttacgtt tcaaaggaag ggcaaacgag 300
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ggcgagctgt tgctgagcct ggccggagtc atgggatggc ccaaagccta tctcgattgt 420
tggttcaact ggttccatag gaacacagan attggacatt gttgcggaga atcctgataa 480
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Ser Thr Gly Ser Ile Gly Thr Gln Xaa Leu Asp Ile Val Ala Glu Asn  
20 25 30

Pro Asp Lys Phe Arg Val Val Ala Leu Ala Ala Gly Ser Asn Val Thr  
35 40 45

Leu Leu Ala Asp Gln Val Lys Thr Phe Xaa Pro Lys Leu Val Arg  
50 55 60

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<221> unsure

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ggttgtgcag ggctgaagcc tacagttgct gcaattgaag ctggtaaaga catagcattg 180  
gcaaacaaag agacacttat tgcaggtggt ccttttgtgc ttccccttgc acacaaacac 240  
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tggccanttg acaggctgaa agatgtaaaa gttgctgacg ctttaaagca tccaaaactgg 420  
aatatgggaa ggaagatcac agtagattct gctactttat tcaacaaggg tttagaagtt 480  
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 20 25 30  
 Val Thr Val Val Thr Gly Ile Val Gly Cys Ala Gly Leu Lys Pro Thr  
 35 40 45  
 Val Ala Ala Ile Glu Ala Gly Lys Asp Ile Ala Leu Ala Asn Lys Glu  
 50 55 60  
 Thr Leu Ile Ala Gly Gly Pro Phe Val Leu Pro Leu Ala His Lys His  
 65 70 75 80  
 Lys Val Lys Ile Leu Pro Ala Asp Ser Glu His Ser Ala Ile Phe Gln  
 85 90 95  
 Cys Ile Gln Gly Leu Ser Glu Gly Ala Leu Arg Arg Ile Ile Leu Thr  
 100 105 110  
 Ala Ser Xaa Gly Ala Phe Xaa Asp Trp Pro Xaa Asp Arg Leu Lys Asp  
 115 120 125  
 Val Lys Val Ala Asp Ala Leu Lys His Pro Asn Trp Asn Met Gly Arg  
 130 135 140  
 Lys Ile Thr Val Asp Ser Ala Thr Leu Phe Asn Lys Gly Leu Glu Val  
 145 150 155 160  
 Ile Glu Ala His Tyr Leu Phe Gly Ala Glu Tyr Asp Asp Ile Glu Ile  
 165 170 175

Val Ile His Pro Gln Ser Ile Ile His Ser Met Val Glu Thr Gln Asp  
180 185 190

Ser Ser Val Leu Ala Gln Leu Gly Trp Pro Asp Met Arg Leu Pro Ile  
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Leu Tyr Thr Leu Ser Trp Pro Asp Arg  
210 215

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<212> DNA  
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cggcacgagg tttaaaccag acgtcgagtc gagcattaac tcagtcaggg tggccatggc 180  
gctcaaggtc gtctctttcc cgggggactt ggccgcggtc tcattcctcg actccaacag 240  
aggaggagct ttcaaccagc tcaaagtggg cctcccgttt caaacgaggg acagaagagc 300  
agtttccctg agaaggactt gctgttcaat gcaacagggt ccaccaccag catggcctgg 360  
tcgagccgtt gttgaacctg ggaggaggtc atgggatggc cccaagccta tctcaattgt 420  
tggctcaacc ggttctattg gcacacagac attggacata gttgcggaga atccagataa 480  
attccgggtt gttgctcttg ctgctggctc caatgtgact cttctagctg atcaggtgaa 540  
aacattcaaa ccaaagcttg ttgctgtaag aaatgagtc ttagttgatg agctaaagga 600  
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ctctatgatt gaaacccagg attcatctgt gttggctcaa ctgggatggc cagatatgag 1200  
gataccaacc ttatacacca tgtcttgccc agacagaatc tattgctcag aggtcacctg 1260  
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20 25 30

Leu	Pro	Phe	Gln	Thr	Arg	Asp	Arg	Arg	Ala	Val	Ser	Leu	Arg	Arg	Thr	35	40	45
Cys	Cys	Ser	Met	Gln	Gln	Ala	Pro	Pro	Pro	Ala	Trp	Pro	Gly	Arg	Ala	50	55	60
Val	Val	Glu	Pro	Gly	Arg	Arg	Ser	Trp	Asp	Gly	Pro	Lys	Pro	Ile	Ser	65	70	75
Ile	Val	Gly	Ser	Thr	Gly	Ser	Ile	Gly	Thr	Gln	Thr	Leu	Asp	Ile	Val	85	90	95
Ala	Glu	Asn	Pro	Asp	Lys	Phe	Arg	Val	Val	Ala	Leu	Ala	Ala	Gly	Ser	100	105	110
Asn	Val	Thr	Leu	Leu	Ala	Asp	Gln	Val	Lys	Thr	Phe	Lys	Pro	Lys	Leu	115	120	125
Val	Ala	Val	Arg	Asn	Glu	Ser	Leu	Val	Asp	Glu	Leu	Lys	Glu	Ala	Leu	130	135	140
Ala	Asp	Cys	Asp	Trp	Lys	Pro	Glu	Ile	Ile	Pro	Gly	Glu	Gln	Gly	Val	145	150	155
Ile	Glu	Val	Ala	Arg	His	Pro	Asp	Ala	Val	Thr	Val	Val	Thr	Gly	Ile	165	170	175
Val	Gly	Cys	Ala	Gly	Leu	Lys	Pro	Thr	Val	Ala	Ala	Ile	Glu	Ala	Gly	180	185	190
Lys	Asp	Ile	Ala	Leu	Ala	Asn	Lys	Glu	Thr	Leu	Ile	Ala	Gly	Gly	Pro	195	200	205
Phe	Val	Leu	Pro	Leu	Ala	Gln	Lys	His	Lys	Val	Lys	Ile	Leu	Pro	Ala	210	215	220
Asp	Ser	Glu	His	Ser	Ala	Ile	Phe	Gln	Cys	Ile	Gln	Gly	Leu	Pro	Glu	225	230	235
Gly	Ala	Leu	Arg	Arg	Ile	Ile	Leu	Thr	Ala	Ser	Gly	Gly	Ala	Phe	Arg	245	250	255
Asp	Trp	Pro	Val	Asp	Lys	Leu	Lys	Glu	Val	Lys	Val	Ala	Asp	Ala	Leu	260	265	270
Lys	His	Pro	Asn	Trp	Asn	Met	Gly	Lys	Lys	Ile	Thr	Val	Asp	Ser	Ala	275	280	285
Thr	Leu	Phe	Asn	Lys	Gly	Leu	Glu	Val	Ile	Glu	Ala	His	Tyr	Leu	Phe	290	295	300
Gly	Ala	Glu	Tyr	Asp	Asp	Ile	Glu	Ile	Val	Ile	His	Pro	Gln	Ser	Ile	305	310	315
Ile	His	Ser	Met	Ile	Glu	Thr	Gln	Asp	Ser	Ser	Val	Leu	Ala	Gln	Leu	325	330	335
Gly	Trp	Pro	Asp	Met	Arg	Ile	Pro	Thr	Leu	Tyr	Thr	Met	Ser	Trp	Pro	340	345	350

Asp Arg Ile Tyr Cys Ser Glu Val Thr Trp Pro Arg Leu Asp Leu Cys  
 355 360 365  
 Lys Leu Gly Ser Leu Thr Phe Lys Ala Pro Asp Asn Val Lys Tyr Pro  
 370 375 380  
 Ser Met Asp Leu Ala Tyr Ala Ala Gly Arg Ala Gly Gly Thr Met Thr  
 385 390 395 400  
 Gly Val Leu Ser Ala Ala Asn Glu Lys Ala Val Glu Leu Phe Ile Asp  
 405 410 415  
 Glu Lys Ile Gly Tyr Leu Asp Ile Phe Lys Val Val Glu Leu Thr Cys  
 420 425 430  
 Asp Ala His Arg Asn Glu Leu Val Thr Arg Pro Ser Leu Glu Glu Ile  
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 aacataaaaa ttcttcccgc tgattcggaa cattctgcaa ttttctcagtc tatccagggg 720  
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 caatccatca tacattcctt ggttgaaacg cangattcat ctgttaatgc acagttgggg 1020  
 atacctgaca tgcgcttacc gctcctttat acattatctt ggccagaaag aatctattgc 1080  
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Lys Asp Ser Asp Thr Thr Val Glu Arg Arg Val Tyr Cys Ser Ala Ala
          35              40              45

Ala Gln Ser Pro Pro Pro Ala Trp Pro Gly Thr Ala Ile Pro Glu Pro
          50              55              60

Ser Asp Phe Lys Thr Trp Asp Gly Gln Lys Pro Ile Ser Val Leu Gly
          65              70              75              80

Ser Thr Gly Ser Ile Gly Thr Gln Thr Leu Ser Ile Val Ala Glu Phe
          85              90              95

Pro Glu Arg Phe Lys Val Val Ser Leu Ala Ala Gly Ser Asn Ile Thr
          100             105             110

Leu Leu Ala Asp Gln Ile Lys Thr Phe Lys Pro Glu Val Val Gly Leu
          115             120             125

Arg Asn Glu Ser Leu Ile Asp Glu Leu Lys Glu Ala Leu Ala Asp Val
          130             135             140

Asp His Lys Pro Glu Ile Ile Pro Gly Glu Gln Gly Val Ile Glu Ala
          145             150             155             160

Ala Arg His Pro Asp Ala Thr Thr Val Val Thr Gly Ile Val Gly Cys
          165             170             175

Ala Gly Leu Lys Pro Thr Val Ala Ala Ile Glu Ala Gly Lys Asp Ile
          180             185             190

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Ala	Leu	Ala	Asn	Lys	Glu	Thr	Met	Ile	Ala	Gly	Ala	Pro	Phe	Val	Leu	195	200	205	
Pro	Leu	Ala	His	Lys	His	Asn	Ile	Lys	Ile	Leu	Pro	Ala	Asp	Ser	Glu	210	215	220	
His	Ser	Ala	Ile	Phe	Gln	Ser	Ile	Gln	Gly	Leu	Pro	Lys	Gly	Ala	Leu	225	230	235	240
Arg	Lys	Ile	Leu	Leu	Thr	Gly	Ser	Gly	Gly	Ala	Phe	Arg	Glu	Trp	Pro	245	250	255	
Ala	Glu	Lys	Met	Lys	Asp	Ile	Lys	Leu	Ala	Asp	Ala	Leu	Lys	His	Pro	260	265	270	
Ile	Trp	Ser	Leu	Gly	Arg	Lys	Ile	Thr	Ile	Asp	Ser	Ala	Thr	Leu	Phe	275	280	285	
Asn	Lys	Gly	Leu	Glu	Val	Ile	Glu	Ala	His	Tyr	Leu	Phe	Gly	Ala	Ser	290	295	300	
Tyr	Asp	Asp	Ile	Glu	Ile	Val	Ile	His	Pro	Gln	Ser	Ile	Ile	His	Ser	305	310	315	320
Leu	Val	Glu	Thr	Xaa	Asp	Ser	Ser	Val	Asn	Ala	Gln	Leu	Gly	Ile	Pro	325	330	335	
Asp	Met	Arg	Leu	Pro	Leu	Leu	Tyr	Thr	Leu	Ser	Trp	Pro	Glu	Arg	Ile	340	345	350	
Tyr	Cys	Ser	Glu	Val	Thr	Trp	Pro	Arg	Leu	Asp	Leu	Ser	Lys	Tyr	Gly	355	360	365	
Ser	Leu	Thr	Phe	Tyr	Ala	Pro	Asp	Asp	Lys	Lys	Phe	Pro	Ser	Val	Asn	370	375	380	
Leu	Cys	Tyr	Ala	Ala	Gly	Arg	Ala	Gly	Gly	Thr	Met	Thr	Gly	Val	Leu	385	390	395	400
Ser	Ala	Ala	Asn	Glu	Lys	Ala	Val	Glu	Met	Phe	Val	Glu	Glu	Lys	Ile	405	410	415	
Ser	Tyr	Leu	Asp	Ile	Phe	Lys	Val	Val	Glu	Leu	Thr	Cys	Gln	Glu	His	420	425	430	
Gln	Lys	Glu	Leu	Val	Ala	Ser	Pro	Ser	Leu	Glu	Glu	Ile	Ile	His	Tyr	435	440	445	
Asp	Gln	Trp	Ala	Arg	Gln	Tyr	Ala	Ala	Ser	Leu	Gln	Lys	Xaa	Phe	Lys	450	455	460	
Cys	Leu	Asn	Pro	Ile	Phe	Leu	Thr	Tyr	Phe	Arg	Ser	Trp	Gly	Cys	Gly	465	470	475	480
Gly	Leu	Leu	Ala	Thr	Ala	Ser	Ile	Phe	Cys	Lys	Cys	Ile	Val	Gly	Ser	485	490	495	
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 actggttcaa ttggaactca gacactagat attgtggcag agaatccaga taagttaa 180  
 gttgtggcac ttgcagctgg ttcaaagtgt actcttcttg cagaccaggt aaaaagattt 240  
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 cgtcaccag atgcagttag ttagtcaca ggaatagtag gctgtgcagg actgaagcca 420  
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 20 25 30  
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 35 40 45  
 Leu Asp Ile Val Ala Glu Asn Pro Asp Lys Phe Lys Val Val Ala Leu  
 50 55 60  
 Ala Ala Gly Ser Asn Val Thr Leu Leu Ala Asp Gln Val Lys Arg Phe  
 65 70 75 80  
 Lys Pro Gln Leu Val Ala Val Arg Asn Glu Ser Leu Ile Ala Glu Leu  
 85 90 95

Glu Glu Ala Leu His Asp Val Glu Glu Lys Pro Glu Ile Ile Pro Gly  
 100 105 110  
 Glu Gln Gly Ile Ile Glu Val Ala Arg His Pro Asp Ala Val Ser Val  
 115 120 125  
 Val Thr Gly Ile Val Gly Cys Ala Gly Leu Lys Pro Thr Val Ala Ala  
 130 135 140  
 Ile Glu Ala Gly Lys Asp Ile Ala Leu Ala Asn Lys Glu Thr Leu Ile  
 145 150 155 160  
 Ala Gly Gly Pro Leu Ser Pro Leu Ala Gln Lys His Asn Val Lys Ile  
 165 170 175  
 Leu Pro Ala Asp Ser Asp Xaa Ser Ala Ile Phe Gln Cys Ile Gln Gly  
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 Ala Phe Arg Gly Trp Pro Val  
 210 215

<210> 11  
 <211> 642  
 <212> DNA  
 <213> Triticum aestivum

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 tgcctacctg aggacatgct gctccatgca gcagggccca ccgcccgcct ggccaggccg 180  
 agccgtcgtg gaacctgaga ggaggtcgtg ggagggcccc aagcccatct ccatcgctcg 240  
 ctcaaccggt tccataggaa cacagacatt ggacatcggt gcggagaacc tgacaagtgc 300  
 ccgggttgct gcccttgctg ctgggtccaa cgtcactcct ctagctgata aggtgaaaac 360  
 gttcaaacca aactgggtgg tgttaagaaa cgatccatta cttaacgagc taaaggaagc 420  
 attaactggt tgtgaaagag atccggatta tccctgggga caagtgcata gaggcgcacc 480  
 caccgcgacc attacatcct tacggnatat aggttncaag atcaacctac attncaacat 540  
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 <211> 94  
 <212> PRT  
 <213> *Triticum aestivum*

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 20 25 30  
 Ser Thr Gly Ser Ile Gly Thr Gln Thr Leu Asp Ile Val Ala Glu Asn  
 35 40 45  
 Leu Thr Ser Ser Arg Val Val Ala Leu Ala Ala Gly Ser Asn Val Thr  
 50 55 60  
 Pro Leu Ala Asp Lys Val Lys Thr Phe Lys Pro Asn Trp Val Val Leu  
 65 70 75 80  
 Arg Asn Asp Pro Leu Leu Asn Glu Leu Lys Glu Ala Leu Thr

<210> 13  
 <211> 360  
 <212> DNA  
 <213> Triticum aestivum

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 ggcgtggagc ttgttcatcg acgaaaagat taactacctt ggacatcttc aaggngggng 300  
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 <212> PRT  
 <213> Triticum aestivum

<220>  
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 20 25 30  
 Pro Arg Leu Asp Leu Cys Lys Leu Gly Ser Leu Thr Phe Lys Ala Pro  
 35 40 45

Asp Asn Val Lys Tyr Pro Ser Val Asp Leu Xaa Xaa Tyr Ala Ala Gly  
50 55 60

Arg Ala Gly Gly Thr Met Thr Gly Phe Leu Ser Ala Ala Asn Glu Lys  
65 70 75 80

Ala Trp Ser Leu Phe Ile Asp Glu Lys Ile Asn Tyr Leu  
85 90

<210> 15  
<211> 1847  
<212> DNA  
<213> Zea mays

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tggtgcact caaggcatcg ttccgggggtg agctcagcgc cgcttccttc ctgcactcca 240  
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ctatttcact gagaaggaca tgctgttcta tgcaacaggc tccaccacca gcatggcctg 360  
ggcgagctgt tgctgagcct ggccggagggt catgggatgg cccaaagcct atctcgattg 420  
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aagccttggc tgattgcgaa gagaagccag aaattattcc tggggagcaa ggtgtcatag 660  
aagttgctcg ccatccagat gcagttacag ttgtcacagg gatagtaggt tgtgcagggc 720  
tgaagcctac agttgctgca attgaagctg gtaaagacat agcattggca acaaaagaga 780  
cacttattgc aggtggtcct tttgtgcttc cccttgcaaca caaacacaaa gtgaaaattc 840  
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<211> 472  
<212> PRT  
<213> Zea mays

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35 40 45  
Cys Ser Met Gln Gln Ala Pro Pro Ala Trp Pro Gly Arg Ala Val  
50 55 60  
Ala Glu Pro Gly Arg Arg Ser Trp Asp Gly Pro Lys Pro Ile Ser Ile  
65 70 75 80  
Val Gly Ser Thr Gly Ser Ile Gly Thr Gln Thr Leu Asp Ile Val Ala  
85 90 95  
Glu Asn Pro Asp Lys Phe Arg Val Val Ala Leu Ala Ala Gly Ser Asn  
100 105 110  
Val Thr Leu Leu Ala Asp Gln Val Lys Thr Phe Lys Pro Lys Leu Val  
115 120 125  
Ala Val Arg Asn Glu Ser Leu Val Asp Glu Leu Lys Glu Ala Leu Ala  
130 135 140  
Asp Cys Glu Glu Lys Pro Glu Ile Ile Pro Gly Glu Gln Gly Val Ile  
145 150 155 160  
Glu Val Ala Arg His Pro Asp Ala Val Thr Val Val Thr Gly Ile Val  
165 170 175  
Gly Cys Ala Gly Leu Lys Pro Thr Val Ala Ala Ile Glu Ala Gly Lys  
180 185 190  
Asp Ile Ala Leu Ala Asn Lys Glu Thr Leu Ile Ala Gly Gly Pro Phe  
195 200 205  
Val Leu Pro Leu Ala His Lys His Lys Val Lys Ile Leu Pro Ala Asp  
210 215 220  
Ser Glu His Ser Ala Ile Phe Gln Cys Ile Gln Gly Leu Ser Glu Gly  
225 230 235 240  
Ala Leu Arg Arg Ile Ile Leu Thr Ala Ser Gly Gly Ala Phe Arg Asp  
245 250 255  
Trp Pro Val Asp Arg Leu Lys Asp Val Lys Val Ala Asp Ala Leu Lys  
260 265 270  
His Pro Asn Trp Asn Met Gly Arg Lys Ile Thr Val Asp Ser Ala Thr  
275 280 285  
Leu Phe Asn Lys Gly Leu Glu Val Ile Glu Ala His Tyr Leu Phe Gly  
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Ala Glu Tyr Asp Asp Ile Glu Ile Val Ile His Pro Gln Ser Ile Ile  
305 310 315 320  
His Ser Met Val Glu Thr Gln Asp Ser Ser Val Leu Ala Gln Leu Gly  
325 330 335

Trp Pro Asp Met Arg Leu Pro Ile Leu Tyr Thr Leu Ser Trp Pro Asp  
 340 345 350  
 Arg Ile Tyr Cys Ser Glu Val Thr Trp Pro Arg Leu Asp Leu Cys Lys  
 355 360 365  
 Leu Gly Ser Leu Thr Phe Arg Ala Pro Asp Asn Val Lys Tyr Pro Ser  
 370 375 380  
 Met Asp Leu Ala Tyr Ala Ala Gly Arg Ala Gly Gly Thr Met Thr Gly  
 385 390 395 400  
 Val Leu Ser Ala Ala Asn Glu Lys Ala Val Glu Leu Phe Ile Asp Glu  
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 Lys Ile Ser Tyr Leu Asp Ile Phe Lys Val Val Glu Leu Thr Cys Asn  
 420 425 430  
 Ala His Arg Asn Glu Leu Val Thr Ser Pro Ser Leu Glu Glu Ile Val  
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 <212> DNA  
 <213> Glycine max

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 tattgtggca gagaatccag ataagttaa agttgtggca cttgcagctg gttcaaattg 420  
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<210> 18
<211> 475
<212> PRT
<213> Glycine max

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Gly Phe Ala Phe Lys Arg Lys Glu Arg Arg Ala Ala Ser Gly Gly Arg
      35             40             45

Val Tyr Cys Ser Val Gln Ala Thr Pro Pro Pro Pro Ala Trp Pro Gly
      50             55             60

Arg Ala Val Pro Glu Gln Gly Arg Lys Thr Trp Asp Gly Pro Lys Pro
      65             70             75             80

Ile Ser Ile Val Gly Ser Thr Gly Ser Ile Gly Thr Gln Thr Leu Asp
      85             90             95

Ile Val Ala Glu Asn Pro Asp Lys Phe Lys Val Val Ala Leu Ala Ala
      100            105            110

Gly Ser Asn Val Thr Leu Leu Ala Asp Gln Val Lys Arg Phe Lys Pro
      115            120            125

Gln Leu Val Ala Val Arg Asn Glu Ser Leu Ile Ala Glu Leu Glu Glu
      130            135            140

Ala Leu His Asp Val Glu Glu Lys Pro Glu Ile Ile Pro Gly Glu Gln
      145            150            155            160

Gly Ile Ile Glu Val Ala Arg His Pro Asp Ala Val Ser Val Val Thr
      165            170            175

Gly Ile Val Gly Cys Ala Gly Leu Lys Pro Thr Val Ala Ala Ile Glu
      180            185            190

Ala Gly Lys Asp Ile Ala Leu Ala Asn Lys Glu Thr Leu Ile Ala Gly
      195            200            205

Gly Pro Phe Val Leu Pro Leu Ala Gln Lys His Asn Val Lys Ile Leu
      210            215            220

Pro Ala Asp Ser Glu His Ser Ala Ile Phe Gln Cys Ile Gln Gly Leu
      225            230            235            240

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<211> 473  
<212> PRT  
<213> Triticum aestivum

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Leu Thr Phe Gln Arg Arg Asp Lys Arg Ala Ala Tyr Leu Arg Thr Cys  
35 40 45  
Cys Ser Met Gln Gln Gly Pro Pro Pro Ala Trp Pro Gly Arg Ala Val  
50 55 60  
Ala Glu Pro Glu Arg Arg Ser Trp Glu Gly Pro Lys Pro Ile Ser Ile  
65 70 75 80  
Val Gly Ser Thr Gly Ser Ile Gly Thr Gln Thr Leu Asp Ile Val Ala  
85 90 95  
Glu Asn Pro Asp Lys Phe Arg Val Val Ala Leu Ala Ala Gly Ser Asn  
100 105 110  
Val Thr Leu Leu Ala Asp Gln Val Lys Thr Phe Lys Pro Lys Leu Val  
115 120 125  
Ala Val Arg Asn Glu Ser Leu Leu Asn Glu Leu Lys Glu Ala Leu Ala  
130 135 140  
Gly Cys Glu Glu Met Pro Glu Ile Ile Pro Gly Glu Gln Gly Val Ile  
145 150 155 160  
Glu Val Ala Arg His Pro Asp Ala Val Thr Val Val Thr Gly Ile Val  
165 170 175  
Gly Cys Ala Gly Leu Lys Pro Thr Val Ala Ala Ile Glu Ala Gly Lys

180					185					190					
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		195					200					205			
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	210					215					220				
Ser	Glu	His	Ser	Ala	Ile	Phe	Gln	Cys	Ile	Gln	Gly	Leu	Ser	Glu	Gly
	225				230					235					240
Ser	Leu	Arg	Arg	Val	Ile	Leu	Thr	Ala	Ser	Gly	Gly	Ala	Phe	Arg	Asp
				245					250					255	
Trp	Pro	Val	Glu	Lys	Leu	Lys	Asp	Val	Lys	Val	Ala	Asp	Ala	Leu	Lys
			260					265					270		
His	Pro	Asn	Trp	Ser	Met	Gly	Lys	Lys	Ile	Thr	Val	Asp	Ser	Ala	Thr
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	305				310					315					320
His	Ser	Met	Ile	Glu	Thr	Gln	Asp	Ser	Ser	Val	Leu	Ala	Gln	Leu	Gly
				325					330					335	
Trp	Pro	Asp	Met	Arg	Leu	Pro	Ile	Leu	Tyr	Thr	Leu	Ser	Trp	Pro	Asp
			340					345					350		
Arg	Val	Tyr	Cys	Ser	Glu	Val	Thr	Trp	Pro	Arg	Leu	Asp	Leu	Cys	Lys
		355					360					365			
Leu	Gly	Ser	Leu	Thr	Phe	Lys	Ala	Pro	Asp	Asn	Val	Lys	Tyr	Pro	Ser
	370					375					380				
Val	Asp	Leu	Ala	Tyr	Ala	Ala	Gly	Arg	Ala	Gly	Gly	Thr	Met	Thr	Gly
	385				390					395					400
Val	Leu	Ser	Ala	Ala	Asn	Glu	Lys	Ala	Val	Glu	Leu	Phe	Ile	Asp	Glu
			405						410					415	
Lys	Ile	Ser	Tyr	Leu	Asp	Ile	Phe	Lys	Val	Val	Glu	Met	Thr	Cys	Asp
			420					425					430		
Ala	His	Arg	Asn	Glu	Leu	Val	Thr	Arg	Pro	Ser	Leu	Glu	Glu	Ile	Ile
		435					440					445			
His	Tyr	Asp	Gln	Trp	Ala	Arg	Lys	Phe	Ala	Ala	Asn	Leu	Gln	Pro	Ser
	450					455					460				
Ser	Ser	Gly	Arg	Ser	Pro	Val	Leu	Ala							
	465				470										

<210> 21  
 <211> 406  
 <212> PRT  
 <213> Arabidopsis thaliana

<400> 21

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			20					25					30			
Pro	Asp	Lys	Phe	Arg	Val	Val	Ala	Leu	Ala	Ala	Gly	Ser	Asn	Val	Thr	
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His	Ser	Ala	Ile	Phe	Gln	Cys	Ile	Gln	Gly	Leu	Pro	Glu	Gly	Ala	Leu	
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Arg	Lys	Ile	Ile	Leu	Thr	Ala	Ser	Gly	Gly	Ala	Phe	Arg	Asp	Trp	Pro	
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Ser	Leu	Thr	Phe	Lys	Lys	Pro	Asp	Asn	Val	Lys	Tyr	Pro	Ser	Met	Asp	

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 Arg Asn Glu Leu Val Thr Ser Pro Ser Leu Glu Glu Ile Val His Tyr  
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                                  20                                 25                                 30  
 Gly Gly Phe Ala Phe Lys Arg Lys Asp Ser Arg Cys Thr Ala Ala Lys  
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 Arg Val His Cys Ser Ala Gln Ser Gln Ser Pro Pro Pro Ala Trp Pro  
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 Gly Arg Ala Phe Pro Glu Pro Gly Arg Met Thr Trp Glu Gly Pro Lys  
   65                                 70                                 75                                 80  
 Pro Ile Ser Val Ile Gly Ser Thr Gly Ser Ile Gly Thr Gln Thr Leu  
                                  85                                 90                                 95  
 Asp Ile Val Ala Glu Asn Pro Asp Lys Phe Arg Ile Val Ala Leu Ala  
                                  100                                 105                                 110  
 Ala Gly Ser Asn Val Thr Leu Leu Ala Asp Gln Lys Ala Phe Lys Pro  
                                  115                                 120                                 125  
 Lys Leu Val Ser Val Lys Asp Glu Ser Leu Ile Ser Glu Leu Lys Glu  
   130                                 135                                 140  
 Ala Leu Ala Gly Phe Glu Asp Met Pro Glu Ile Ile Pro Gly Glu Gln  
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 Gly Met Ile Glu Val Ala Arg His Pro Asp Ala Val Thr Val Val Thr  
                                  165                      170                      175  
 Gly Ile Val Gly Cys Ala Gly Leu Lys Pro Thr Val Ala Ala Ile Glu

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Gly	Pro	Phe	Val	Leu	Pro	Leu	Ala	Lys	Lys	His	Asn	Val	Lys	Ile	Leu		
	210						215				220						
Pro	Ala	Asp	Ser	Glu	His	Ser	Ala	Ile	Phe	Gln	Cys	Ile	Gln	Gly	Leu		
	225				230					235					240		
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				245					250					255			
Phe	Arg	Asp	Leu	Pro	Val	Glu	Lys	Leu	Lys	Glu	Val	Lys	Val	Ala	Asp		
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Ala	Leu	Lys	His	Ser	Asn	Trp	Asn	Met	Gly	Lys	Lys	Asn	Thr	Val	Arg		
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Leu	Leu	Gln	Leu	Phe	Phe	Asn	Lys	Gly	Leu	Glu	Val	Ile	Lys	Ala	His		
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Tyr	Leu	Phe	Gly	Ala	Glu	Tyr	Asp	Asp	Ile	Glu	Ile	Val	Ile	His	Ser		
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Ala	Gln	Leu	Gly	Trp	Pro	Asp	Met	Arg	Leu	Pro	Ile	Leu	Tyr	Thr	Leu		
			340					345					350				
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Glu	Ile	Val	His	Tyr	Asp	Gln	Trp	Ala	Arg	Asp	Tyr	Ala	Ala	Thr	Val		
	450						455				460						
Leu	Lys	Ser	Ala	Gly	Leu	Ser	Pro	Ala	Leu	Val							
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